South Pacific Regional Environment Programme

First SPREP Meeting of Regional Meteorological Service Directors

Held on

19 - 21 October 1993

in **Port Vila, Vanuatu**

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Meeting Report

Introduction

1. The report of the 1991 feasibility study on climate in the Pacific region titled "The Changing Climate in Paradise" identified a number of projects aimed at raising the state of climate in this region. Some of these projects are currently funded and under way. In order to implement the remaining projects identified, the SPREP secretariat has been seeking financial assistance, in particular for sub project 4.2; "Regional Meeting of Directors". The first meeting of Directors of Meteorological Services for SPREP member countries and territories was convened in Port Vila, Vanuatu, from 19-21 October 1993. This meeting was funded by the New Zealand Government as the major sponsor, with assistance from the Government of the Republic of Vanuatu, the World Meteorological Organisation and the Vaisala (Australia) company.

2. The objectives of the meeting were to;

(a) Provide the foundation for regional cooperation in climate monitoring and climate data services;

(b) Discuss projects identified in the report "The Changing Climate in Paradise", particularly those relating to climate monitoring;

(c) Assist SPREP in developing its Climate Change programme, especially in the meteorological and climatological sectors;

(d) Discuss the working relationship between SPREP and its member governments and the World Meteorological Organisation (WMO), and;

(e) Review and discuss the activities of meteorological services in the region.

Opening Session

3. The Director of the Vanuatu Meteorological Service, Mr. Henry Taiki, introduced the Honourable Mr. Edward Tabisari, Minister for Health and acting Minister responsible for Meteorological Services for the Government of Vanuatu, to officially open the meeting, followed by Dr. Karjoto Sontokusumo, acting President, World Meteorological Organisation Regional Association Five (WMO, RA-V) to deliver a welcoming address on behalf of WMO.

4. Mr. Tabisari spoke of the strategic importance of meteorological services in dealing with the impacts of climate and destructive meteorological phenomena (see Annex 3 for the complete text of the ministers opening speech). Dr. Sontokusumo outlined the current activities of WMO, and reaffirmed its commitment to the meteorology and climate services in the region, particularly through the programmes and activities of RA-V. Both speakers commended the SPREP secretariat for its initiative in convening this meeting, and emphasised the need for regional cooperation in the field of climate.

5. Mr. Donald Stewart, Deputy Director of the South Pacific Regional Environment Programme (SPREP) welcomed the delegates on behalf of SPREP, and stated that the direction of the SPREP Climate Change programme would be driven by the recommendations from this meeting. Following the opening speeches, delegates were asked to consider the provisional agenda. With no amendments made to the agenda, it was approved as tabled. and is included as annex 1 of this report.

Item 1 - Review of Climate and Related Meteorological Activities and Progress.

(a) Global Review

6. The formal proceedings commenced with a review of current global climate activities by Mr. J Bruce, (WMO). This included reference to a number of WMO projects such as the World Climate Programme (WCP). Reference was made to activities of other international organisations such as the International Geoshere/Biosphere Programme (IGBP) and the International Council of Scientific Union (ICSU). The importance of the International Decade for Natural Disaster Reduction (IDNDR) was noted. IDNDR aims to provide an assessment of risk, plans for mitigation and ready access to warning systems to the worlds population.

7. The activities of the Intergovernmental Panel on Climate Change (IPCC) were discussed. IPCC has three working groups, working on the science of climate change, impacts of climate change, and issues on social and economic dimensions of climate change. The speaker elaborated on the United Nations Framework Convention on Climate Change (FCCC) activities, and the focus on small island states. One most important aim of FCCC is to stabilise greenhouse gas concentrations at levels that will not lead to dangerous interference to the global climate system.

8. In conclusion it was noted that, despite their apparent complexity, these technical activities are mesh together. The national, regional and global climate activities form the fundamental base. IPCC provides a periodic assessment of scientific knowledge, and FCCC is the international vehicle for policy action on these assessments.

9. Mr. Berridge (CMO) noted that coordinating climate change activities, programmes etc. by so many international, regional and national groups must be difficult, and asked for detail as to how this is achieved. WMO stated that this issue is currently being addressed by IPCC together with UNEP and UNESCO, and it is hoped that the already high level of coordination can be further improved.

(b) Regional Review

10. Mr. R. Prasad (Fiji) presented an overview of the status of meteorological responsibilities of Fiji in the region. Presently Fiji operates the National Weather Service (NWS), Tropical Cyclone Warning Centre (TCWC), and a Climatology and Special Services centre. Fiji is responsible for providing forecasts and warnings to 12 countries and territories in the region, as well as services to the marine community over a vast area of the Pacific Ocean south of the equator, and aviation services for a large part of the South-West Pacific. The main focus in Fiji is the provision of forecast and warning services. Due to ongoing staff shortages, the Climate and Special Services programme receives less priority.

11. In serving neighbouring islands, Fiji noted that the current slow and outdated communication links in the region pose a significant problem in meeting their obligations as required by WMO. There is a clear need for an alternative link to ensure services are not disrupted, particularly during events such as tropical cyclones.

12. At present the neighbouring islands receive their forecasts and warnings from Fiji free of charge, and there is a significant financial burden associated with the provision of such a service. To address these problems, a number of issues were noted for further discussion. These were;

(i) Assistance from SPREP metropolitan countries in staff and training.

(ii) Assistance from SPREP Metropolitan countries, and other donors, for funding to maintain the present services

(iii) Formalising arrangements with countries and territories in the region to establish Nadi as a centre of meteorological expertise.

Fiji concluded by asking delegates to consider these issues, and ask how they may serve to improve the capability of Fiji in providing the best service possible to the region.

13. Mr. A. Titimaea (Western Samoa) commended Fiji for its commitment to its regional responsibilities. He commented that the small meteorological services around the region provide support for Nadi through the provision of observational data. Western Samoa supported Fiji in its quest for Regional Specialised Meteorological Centre (RSMC) status. He asked for clarification of Fiji's responsibility for advisory bulletins on tropical cyclones. Fiji replied with a clarification of the advisory service to countries for which it has responsibility. Western Samoa made a further comment that the suggestion of direct contributions from countries for services provided by Nadi need to go back to national governments.

14. Mme I. Leleu (French Polynesia), outlined the history of the Meteo France Climate data base and its use for decision making. In 1989 Australia, New Zealand and United Kingdom agreed to exchange climate data and information under a tripartite arrangement known as ANZUK. In 1990 a workshop was held to refine historical climate data records. In 1991 Meteo France joined, and the new arrangement became known as FRANZUK.

15. France is involved in collection of monthly climate data from its territories and Vanuatu, and links this data with other information from the region. France has also made a concerted effort to examine the archives and fill in the gaps in the existing climate records. In the future the data base will be enhanced by standardising the data and completing the research for missing data. Real time feeding needs to continue. It will be important to maintain the quality of data. Once the data base has been refined, there is a need for France to participate in studies and projects in the region.

16. Australia asked French Polynesia if there has been any evidence from the data of atmospheric warming in French Polynesia. French Polynesia stated that some warming is evident; but there were no clear trend. Dr. R. Basher (NIWA) concurred, and commented further on the availability of climate diagnostics from Fiji Climate Centre.

17. Mr. A. Akopo (America Samoa) asked Fiji if climate data is used in real time tropical cyclone forecasting. Fiji replied that the lack of available technology and resources precluded this, and there was no likelihood of doing so in the future.

18. CMO asked Fiji to elaborate on its involvement in preparedness for National Disaster Coordination. Fiji replied that they were keen to get involved in this area, and stated that they are already involved through present arrangements with the media in disseminating warning information.

19. Western Samoa asked Fiji to comment on the status of the South Pacific Tropical Cyclone Committee (SP-TCC), in particular funding for this committee. Fiji replied that funding is secure, and the next meeting will be held in Fiji in September 1994.

20. Dr. J. Zillman (Australia) commented that there are links between climate change and extreme meteorological events. Common networks are used to serve climate together with forecasting. He noted that there is a need to make government policy makers aware that development is linked to planning and mitigating the effects of such events. CMO stated that this is not a simple task, and mentioned hesitancy in the political circles in the Caribbean to accept such a concept.

(c) National Review

21. The delegates from each country and territory were asked to comment on progress and activities in their country. Summaries of these statements are in Annex 4.

Item 2 - Programme Coordination Activities

22. Dr. C. Kaluwin (SPREP) gave a brief review of the SPREP Climate Change programme, and how it overlaps with other issues of importance to the governments of the region. The work programme follows from the Second SPREP Meeting on Climate Change and Sea Level Rise, held in Noumea, New Caledonia, in 1992. Training components are already included in the work programme. The programme also coordinates the input of regional governments in programmes such as FCCC, IPCC, as well as linking with the programmes of WMO. The idea of coordination is emphasised on scales from international to regional to national.

23. Dr. B Brook, (WMO/Australia), presented a summary of Australian International Development Assistance Bureau (AIDAB) funded projects to secure climate data in the south-west Pacific. Firstly, the speaker gave an overview of the past activities relating to climate, and concerns expressed by Pacific leaders regarding climate and climate change, and the commitment by Australia to conduct feasibility studies in this regard. The projects for which the funding is now committed were identified as sub-projects 1.1., 1.2 and 1.3 from "The Changing Climate in Paradise" report. Over one million Australian dollars has been committed over the next three years to improve the basic observational network which is the basis for climate monitoring.

24. Secondly, it was noted that there is also a training component included in these projects, encompassing basic observing methods, maintenance, and the importance of observing systems in climate monitoring. The speaker concluded by acknowledging the great experience of the New Zealand Meteorological Service in this region, and requested that they be involved in this project as much as possible. Mr. J. Lumsden (New Zealand) praised Australia for its initiative in this area, and reaffirmed its commitment to supporting meteorology in the region and its desire to continue working closely with Australia in this area.

25. CMO spoke on the experience of his organisation as an example of regional cooperation between meteorological services. Cooperation in this region encompasses all aspects of the science of meteorology, including observations, forecasts, equipment, training and communications. CMO was formally set up in 1973, however cooperation at various levels had existed informally since 1945. The speaker noted that problems existed from time to time, but emphasised that they have only reached their present status through cooperation, and that ongoing cooperation remains necessary if the meteorological services are to maintain their present standard.

26. Australia asked for clarification of how the concept became a reality in the Caribbean. CMO affirmed that the reality of CMO arose from the efforts of the founding director, without whom it may never have happened. WMO asked if the cooperation within CMO extended to matters relating to climate. CMO replied that cooperation extended through all areas of meteorology, including climate activities.

27. Dr. M. Hamnett (PBDC) commented briefly on the planned El Nino Southern Oscillation (ENSO) Application Programme, aimed at the US territories and affiliated countries, as an example of regional cooperation in this region. Through this programme, forecasts of ENSO activity will be made available for the following year. This initiative makes use of knowledge gained from the 10 year Tropical Ocean-Global Atmosphere (TOGA) research experiment which began in 1985 in the Pacific region.

28. The Chair (French Polynesia) opened the floor to discussion on practical technical ways of cooperatively enhancing current climate services. CMO noted that in the Pacific cooperative links are very much in the early stage, and it is necessary to establish the national meteorological services as a first step. The next step might be some organised centre where data could be handled. The Chair raised the matter of technical aspects of regional cooperation; i.e. issues relating to transmission of information and adherence to WMO specifications on meteorological codes. Australia suggested that this matter should be bought to the attention of the relevant WMO people so that the issue can be addressed at the WMO RA-V meeting in Noumea in May 1994.

29. NIWA urged all national meteorological services to complete the standard "end of the month" climate summary for transmission on the Global Ttelecommunications Network (GTS). They are particularly useful, especially for the production of the South Pacific Climate Monitor.

30. CMO remarked that over the past few days it has become apparent to him that there are many different types of communication links in the region. This impacts on the reliability of transmitting data around the region. French Polynesia noted that if all meteorological services used correct message addresses and header information a great deal of the communication problems currently being experienced would be over come.

Item 3 - Regional Climatological Cooperation Feasibility Study

31. The working paper for this agenda item was presented by Dr. R. Basher (NIWA). He began by emphasising that rapid changes are occurring in all aspects of life throughout the world. We now live in a global village, and we can no longer think of ourselves as independent. In the Pacific context climate manifests itself in numerous ways, with inter-relationships among other areas of the environment. The speaker emphasised that knowledge and technology are fundamental in the pursuit of consolidating national meteorological services. Regional cooperation is necessary in the Pacific region where there are so many small independent nations.

32. The question was raised, "regional cooperation to do what?". It was noted that national meteorological services are usually clear about their duties for weather forecasts and warnings, but unsure of their responsibilities in regard to climate. The main requirement is for staff who are trained in climate knowledge and the particular methods of climate services. In larger countries, the activities are often organised under a National Climate Programme. The knowledge and skills required have considerable overlaps with those needed in weather services. Another question raised was that of the future status of national meteorological services. Will they be the same as at present, or shifted toward more environmental/economic related climate services?

33. There are a number of fields of activity identified where cooperation offers advantages, including training, rationalisation of equipment and maintenance, improving the exchange of data and other meteorological information, and developing regional projects that would attract larger and longer term funding from donors. The speaker highlighted the many questions that remain unanswered:

- How can national aspirations and independence be balanced with the competing demands of centralisation?
- How can the diverse interests of the Forum countries and the separate organisational interests of the French territories and the US flag territories be accommodated in a cooperative arrangement?
- What is the optimum degree of central organisation that would bring the most benefits of cooperation? What would be the responsibilities of the coordinating secretariat? Will it require the development of an expensive bureaucracy?
- What should be the main goals and services to be provided under the arrangement?
- How would be the cooperative arrangement be managed and led by member countries?
- Can SPREP provide the coordinating role or host a secretariat, or is a different structure needed?
- How can the Pacific island countries maintain the traditional advantages of being part of the world meteorological community, and obtain the benefits of World Meteorological Organisation (WMO) membership?
- What implications are there for the Nadi Regional Forecasting Centre in such cooperative arrangements? Do Pacific island countries want more explicit contractual arrangements for the Centre? Are they prepared to contribute financial support? How would Fiji's special interests be secured?
- What will be the future of existing bilateral support arrangements. Should they be encouraged to merge into regional programmes?
- What special partnership roles might there be for the Forum's developed members and traditional supporters (Australia, France, New Zealand, United Kingdom and the United States)?

The proposed regional climatological cooperation feasibility study would seek to address all of these questions. A draft terms of reference for the project has been prepared by the speaker, and is included in this report as annex 4.

34. In closing, the speaker noted the importance of identifying the needs of clients in determining what climate service will be provided, and the need to clarify terminology and identify the links that exist between terms such as "weather" and "climate". There are many forms of cooperation, and consideration of the need for better services and reduced costs, and the needs of national versus regional aspirations is fundamental. People need to be encouraged to participate in whatever way they can, and SPREP has the potential to fulfill the role of regional cooperation facilitator.

35. WMO commented that it is important for national meteorological services to continue to be involved in the regional climate cooperation concept. CMO complemented the speaker on his excellent presentation, and concurred that there had to be a change in the future.

36. Fiji asked where organisations such as Fiji Meteorological Service would fit into the framework that was outlined, and reminded delegates that the concept of a Pacific Meteorological Organisation had been discussed at earlier WMO fora. NIWA replied that it was necessary for the meeting delegates, particularly those who are currently served by Fiji, to determine this. WMO noted that it is important that WMO permanent representatives ensure they include the development of their meteorological service into their national development plan. WMO can providing guidance on this matter.

37. Mr. P. Penua (Papua New Guinea) asked if participation in a Pacific regional climate programme would preclude participation in WMO. NIWA replied that he saw no reason why it would not be possible to belong to WMO and RA V, and still participate in a Pacific regional climate programme. Papua New Guinea then asked if it will require country contributions, as some countries are already struggling to meet the WMO financial cost. NIWA noted that this will need to be discussed further.

38. The Chair (French Polynesia) invited the delegates to open discussion on projects to develop a long term strategy for regional cooperation. Western Samoa suggested that a working group be formally convened to draft recommendations to be tabled before the meeting. A group was chosen, comprising Vanuatu (Chair), Solomon Islands, Fiji, New Caledonia and Federated States of Micronesia. The Chair then excused the sub-group from the proceedings to deliberate in private session on possible recommendations.

39. At the request of WMO (Messrs. Bruce and Brook) the meeting was asked to address remaining un-funded projects identified in "The Changing Climate in Paradise", particularly those dealing with climate impacts (project 6). The delegates from counties identified in these projects reaffirmed their desire to see these projects carried out. SPREP secretariat pointed out that a number of these projects can be dealt with by other SPREP programme areas outside of Climate Change, while others still do not fall within the SPREP sphere of activity at all, and would be better handled by other regional organisations.

40. Many delegates, in particular Western Samoa, Papua New Guinea, Cook Islands, Tuvalu, Kiribati, Solomon Islands and the Federated States of Micronesia referred to projects aimed at infrastructure support such as libraries and new buildings and accommodation, and commented that support for such development was still very much needed.

41. Vanuatu, as Chair of the recommendations sub-group, reported on the first draft of recommendations. As the meeting was running late into the evening it was agreed that detailed discussion would be reserved until morning. The working group tabled a second revised list of recommendations at the morning session of the final day. The Chair (Mr. P. Peter, Marshall Islands) opened the floor for discussion on the meeting recommedations.

42. Western Samoa noted that the deliberations of the recommendations working group had not been completed, and asked if they could meet again outside the hours of the full session to consider a third draft of the recommendations. The Chairsuggested the working group reconvene after there had been time for discussion on the current recommendations, which were to follow.

43. In opening the discussion on the list of recommendations, Mr. M. Ariki (Solomon Islands) suggested that training facilities currently available be assessed for its suitability for the needs of the region and outlined the present training offered by the Solomon Island Meteorological Service. At this point Ms. M. Fuamatagi (Tuvalu) noted that the recommendation on training was not first on the list, and suggested that the group discuss each recommendation in order to avoid confusion. Tuvalu also asked Solomon Islands to circulate a training schedule. This would assist Tuvalu in seeking funding for their staff to attend training courses in the Solomon Islands, or other SPREP countries.

44. American Samoa suggested training materials be made and disseminated to countries of the region. Solomon Islands noted that manuals and training materials were available from WMO and the Australian Bureau of Meteorology. These should be used in the first instance. The Chair asked Australia to elaborate on Australia's commitment to training in the region. Australia reaffirmed its commitment to assisting with training for the region, but noted the difficulties of Pacific Islanders have experienced in the past attending courses in the large cities of Australia and New Zealand, and suggested that as much training as possible should be done in the Pacific Islands.

45. New Zealand concurred with the statement by Australia. Mr. R. Hagemeyer (USA) stated that the US National Weather Service facilities were available for training Pacific Island staff. The possibility of a roving seminar involving training experts from Australia or New Zealand to train Pacific Island staff in basic observing skills was mentioned, and received strong support. Mr. A. Suzuki (Federated States of Micronesia) asked for a more general approach to the issue of training needs. PBDC noted that it would not difficult for a needs analysis for training on a regional basis to be made, and this could form the foundation for the provision of training facilities. NIWA made the point that there needs to be a broad approach to training taking into account the overall scope of regional cooperation. The delegate from WMO noted that it keeps inventory of training facilities, and this could be used as a basis for establishing the training that could be provided to the region.

46. Fiji suggested that the discussion on the recommendation regarding training seemed to be consuming too much time with regard to other recommendations the meeting. Western Samoa suggested the first recommendations, dealing with training be re-drafted. Solomon Islands reaffirmed the need to make use of the available training facilities in the region, but noted that it will still be necessary to send staff to Australia and New Zealand for advanced training. French Polynesia reiterated that training is best given to staff locally, and that this needs to be done cooperatively around the region.

47. Fiji commented that there is a requirement for standardisation of equipment, particularly sophisticated equipment such as radar. Australia concurred, and spoke of the efforts of WMO to coordinate this requirement. Papua New Guinea concurred also.

48. Cook Islands referred to the recommendation concerning the exchange of staff, data and information on national regional and international level. He noted the contribution of the Australian Government in this regard. On behalf of the other Pacific Island delegates he also thanked the delegate from NIWA for his valuable service to the region through the South Pacific Climate Monitor, and expressed his wish to see this publication continue in the future.

49. The issue of support for CLICOM was discussed. USA and the Federated States of Micronesia reminded the meeting that many meteorological services in the region do not use CLICOM. New Zealand commented that it may be possible to share a single CLICOM unit among some of the smaller countries who have a very small number of climate stations. Papua New Guinea suggested WMO and SPREP collaborate to assess the needs of small countries in this area. WMO agreed that the needs of CLICOM for countries in the region be identified, and that there is a possibility for groups of small countries to share a CLICOM unit, as in the Caribbean.

50. Fiji suggested a redraft of recommendation 4 concerning support for the Fiji Meteorological Service, and read a new recommendation. CMO agreed, and suggested the need for technical support be highlighted in the new recommendation.

51. With regard to the recommendation concerning communications, PBDC spoke on the current status of PEACESAT and its potential use in the field of meteorology. Fiji spoke on the poor status of communications in the region, and problems with the Aeronautical Fixed Telecommunications Network (AFTN). CMO stated the Civil Aviation Authorities (CAA) are obliged to transmit meteorological data under current international agreements.

52. One of the recommendations from the sub group was that further meetings of this type be convened. WMO suggested that SPREP assist meteorological services in the region regarding policy issues relating to climate, and highlighted the importance of keeping discussion going beyond this meeting. Cook Islands suggested WMO and SPREP coordinate to join forces and combine their meetings. Australia concurred, and noted that savings could be made regarding travel expenses if the next meeting were held in conjunction with the TCP meeting in Nadi later next year. USA and French Polynesia noted that there were problems with some SPREP members not being members of WMO, and that the issues to be discussed differed considerably, and that for these reasons the SPREP Directors meeting be kept separate from WMO meetings.

53. French Polynesia also suggested that the next meeting include longer sessions, and that there be opportunities to break into smaller groups. CMO stated that in his experience it is important to keep the momentum going in the early stages an strongly recommended that annual meetings be held, at least in the formative stages of the process. The SPREP secretariat noted that the schedule of other SPREP workshops and meetings would impact to a large degree on the timing of any forthcoming meeting. The consensus among the delegates was that another SPREP Meeting of Meteorological Service Directors be convened, at a yet to be determined date in the second half of the next calendar year.

54. At this time, the meeting was adjourned to allow the recommendations sub-group to revise the list of recommendations. The third draft of the recommendations was tabled before the delegates when the meeting re-convened, and were adopted as the official meeting recommendations. The final recommendations of the meeting are included in this report as Annex 5.

Item 4 - Issues Relating to Regional Climate Cooperation

55. Mr. N. Koop (SPREP) presented a working paper outlining the Memorandum of Understanding (MOU) currently being negotiated between SPREP and WMO regarding their formal working relationship. A copy of this MOU was presented as an information paper. This MOU has become necessary following the signing of the treaty establishing SPREP as an autonomous regional organisation, and will replace the Letter of Understanding (LOU) between WMO and the Permanent South Pacific Commission (SPC). SPREP outlined discussions he had with WMO staff recently, particularly with staff from the Regional Office for Asia and the South-West Pacific.

56. The speaker acknowledged the excellent work WMO has done, and continues to do, in the region, and commented that the SPREP work programme relating to climate has been implemented to complement and enhance these existing activities. However, there were several areas noted where the WMO system fails to address the special needs of the region. The best interests of the region would only be achieved if SPREP and WMO continued their already close working relationship by ensuring that their respective programmes complement one another.

57. WMO stressed that, while there were some short-comings in the existing WMO programme, the Regional Association for the South-West Pacific would continue to serve the region to its best ability, and WMO were continuing to improve their services. It was agreed that it is important for SPREP and WMO to coordinate their activities to maximise the benefit to the region. Minor changes to the wording of the MOU were suggested by Australia and WMO.

58. There were statements from three organisations and institutions to the meeting. Firstly, Dr. R. Basher (NIWA) spoke on the South Pacific Climate Monitor. At present this is the only monthly climate summary dedicated to the South Pacific. The main focus of this publication is upon rainfall and the status of the El-Nino/Southern Oscillation. Dr. Basher noted that climate data is required from all meteorological services in the region, and urged all delegates to ensure that climate data continue to be collected and disseminated from their national centre. The US affiliated counties and territories north of the equator will soon be contributing data, which will significantly increase the scope of the South Pacific Climate Monitor in the future.

59. Mr. B Caplikas, Sales Manager of Vaisala (Australia), spoke briefly of the interest of his company in this meeting. He made mention of the commitment his country has made to the region in the past, and emphasised that his company is looking at a long term commitment to meteorology in the Pacific.

60. Mr. R. Hagemeyer (USA) spoke briefly on the future of the TOGA observing network in view of the imminent end of this experiment. He stated that, as far as the US is concerned, as many of the observation sites as possible will remain operational after the experiment. In particular, the network of moored buoys in the equatorial western Pacific known as Tropical Atmosphere Ocean (TAO) will remain in place. All delegates welcomed this information, as the loss of the TOGA sites would severely reduce the quantity of useful meteorological data in the region.

Close of Meeting

61. There being no other statements from delegates or observers, the Chair (Tuvalu) thanked the participants for their hard work and diligence in discussing the items set in the agenda and reaching constructive recommendations, and asked SPREP to make a closing statement before handing over to Tonga for the closing remarks.

62. Mr. Don Stewart (SPREP) thanked all the delegates for their participation, and praised their contributions to the question of regional cooperation in meteorology. Special thanks were made to WMO for their assistance and cooperation in convening this group, the delegates from CMO and PBDC for their special input to the discussion, the Government of the Republic of Vanuatu for hosting this meeting, and the kind generousity of the New Zealand government in funding this meeting.

63. The delegate from the Kingdom of Tonga, on behalf of the meetings participants, thanked the SPREP secretariat for its work in convening the meeting, WMO for their participation, and the Vanuatu Government for hosting the meeting. He also thanked Fiji for the special contribution that Fiji Meteorological Service has made to the region. The speaker then presented gifts to the SPREP secretariat, the Director of the Fiji Meteorological Service, and the Director of the Vanuatu Meteorological Service.

64. After a brief prayer from the delegate from American Samoa, the meeting was officially closed.

Annexes

Annex 1 Agenda

TUESDAY 19 OCTOBER 1993

0930-1030 Registration

1030-1100 MORNING TEA

1100-1145 Official Opening *(Government of Vanuatu Minister)*

Introduction from WMO (Acting President WMO RA-V)

Opening Remarks by SPREP (Mr. Donald Stewart, Deputy Director)

1145-1215 Procedural arrangements (*Chair, Agenda Item times, approval of agenda etc.*)

1215-1230 Meeting Photograph

1230-1400 LUNCH

Item 1: Review of Climate and Related Meteorological Activities and Progress

Chairperson: Mr. Henry Taiki, Vanuatu

1400-1500 Global Review

International arrangements, activities e.g. WCP, post UNCED (agenda 21)-GCOS, etc. (J Bruce, IPCC Working Group III - WP1)

1500-1530 Regional Review

(a) Regional Responsibilities of Fiji in the South Pacific (R. Prasad, Director Fiji Meteorological Service) - WP2

1530-1600 AFTERNOON TEA

1600-1630 Regional Review (Continued)

(b) Meteo France South Pacific Climate Data Base (I. Leleu, Directeur Adjoint du Service de la Meteorologie en Polynesie Francaise) - WP3

1630-1700 *Discussion*

1700-1810 National Review

Presentation by participating SPREP Countries and Territories - WP 4 (7 x 10 minutes)

1900-2100 Government of Vanuatu and SPREP Welcome Reception, Hotel Rossi

WEDNESDAY 20 OCTOBER 1993

Item 1: (Continued)

Chairperson: Mr. Arona Ngari, Cook Islands

0830-1030 National Review (Continued)

Continued (12 x 10 minutes)

1030-1100 MORNING TEA

Item 2: Programme Coordination Activities

1100-1130 *SPREP Climate Work Programme(C. Kaluwin, SPREP) WP 5*

1130-1200 *AIDAB Funded Projects to Secure Climate Data in the South-West Pacific (B Brook, Bureau of Meteorology, Australia) WP 6*

1200-1230 *Discussion*

1230-1400 LUNCH

Item 2: (Continued)

Chairperson: Mme. Isabelle Leleu, French Polynesia

1400-1530 *The Caribbean Meteorological Organisation, an Example of Regional Cooperation. (C. Berridge, Director Caribbean Meteorological Organisation)*

1430-1530 *Discussion of practical technical ways of cooperatively enhancing current climate services*

1530-1600 AFTERNOON TEA

Item 3: Regional Climatological Cooperation Feasibility Study

1600-1630 *Aspects of Regional Cooperation in Climatology and Meteorology in the Pacific Islands (R. Basher, National Institute of Water and Atmospheric Research, New Zealand) - WP 7*

1630-1730 *Discussionof project to develop long term strategy for regional cooperation*

1900-2000 SPREP Reception

THURSDAY 21 OCTOBER 1993

Item 3: (Continued)

Chairperson: Mr. Paul Peter, Republic of Marshall Islands

0830-1030 Regional Climatological Cooperation Feasibility Study *(Continued)*
Discussion on Climate Data and Analysis Cooperation in the Pacific Region

1030-1100 MORNING TEA

1100-1230 Regional Climatological Cooperation Feasibility Study *(Continued)*
Recommendations

1230-1400 LUNCH

Item 4: Issues relating to Regional Climate Cooperation

Chairperson: Ms Mapusaga Patiale, Tuvalu

1400-1500 *SPREP-WMO Cooperation in the South Pacific (N Koop, SPREP) WP.8*

1500-1530 Statements from Other Interested Organisations

1530-1600 AFTERNOON TEA

1600-1700 Summary

1700-1730 Closing Remarks (Kingdom of Tonga Delegation)

Annex 2: List of Participants

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Annex 3: Opening Address by Hon. Edward Tabisari

Chairman,

Distinguished guests,

Ladies & gentlemen.

It is not often I get to welcome such a distinguished group of visitors to our shores but, welcome to Vanuatu and I hope that you are settling in well into your new surroundings.

Ladies and Gentlemen, as representatives of the Meteorological Services of your countries, your burden is often a heavy one. All of us here rely on mother nature for our many blessings, for the health and well being of all of our people, for our crops and our livelihoods and for the conduct of all aspects of our daily lives.

But mother nature has many moods and sometimes these moods are not so kind to us, as we know so well. Only a few months ago, central Vanuatu was brutally struck by tropical Cyclone PREMA, and our brothers in FIJI were mauled by Tropical Cyclone KINA, which was reported to be the worst Cyclone there in 50 years. Other nations we know have also suffered badly. Nevertheless, we realise only too well that if it had not been for the timely advice of our respective meteorological services, we undoubtedly, would have suffered an even more devastating blow including, perhaps, loss of lives.

Since science cannot so far tame these storms, the people must look to our meteorological services as our first line of defence. We realise that there are many things needs in this region to improve the service further.

We the Government can only heed your advice. Tell us what tools you need and we will provide them if we can.

As men and women of science, you are well aware of the greenhouse effect and its potential to cause rising sea levels. We must therefore express gratitude to Australia for the initiative in funding and establishing the sea level monitoring stations in 11 Pacific Island States to monitor this effect. We know that Pacific Island States may be among the first to be affected by such sea level rises. We do not wish to be alarmed unnecessarily, but if we are warned in advance we have some chance.

I also believe that the so-called el-nino effect may still be with us for the third season in a row. The eyes of weather scientists the world over are watching the Pacific Area such as never before, for there seems a good chance that some of the keys to unlocking the secrets of the world's climate are hidden in this region. If so the sooner we know more of the answers the better and you are the people we look to for help in these areas.

Vanuatu is proud to host your meeting. May it be fruitful and may your conclusions lead to continuing improvements in all the weather services of the Pacific for the betterment of mankind.

Thank you for your kind attention.

Annex 4: National Review Summary Reports

1. American Samoa

Mr. Akapo Akapo
Meteorologist
American Samoa

There have been a lot of changes, and may I add, improvement, to meteorological services in American Samoa in the last two years. All meteorological services to American Samoa are provided by the National Weather Service Office (NWSO) at Tafuna, American Samoa, which is totally funded and run by the United States government. The NWSO at Tafuna is a first order station, meaning it provides surface observations around the clock. It also provides four upper air (2 pilot balloons and 2 radar) daily.

For almost two years now, our office has been providing four forecasts daily for American Samoa. Marine and public (local) forecasts are issued in the morning, and reissued again in the evening. It must be noted, that although we receive advisories from both Nadi and Honolulu, we in American Samoa issue and disseminate all of our own warnings and forecasts.

We have access to GMS low resolution satellite imagery every three hours, as well as around the clock coverage of the U.S. GOES WEST satellite on a dial-in format to the WSFO Honolulu, via the MICRO SWISS. We also receive surface and 500 hPa prognostic charts for the region from our National Meteorological Centre in Washington D.C., out to 72 hours twice daily. We also have the capability to request for more forecast materials when severe weather threatens the Samoan Islands.

Last March, I met with both Mr. Rajendra Prasad, Director of Fiji Meteorological Services and Mr. Ausetalia Titimaea, Director of the Apia Observatory, which has resulted in closer consultation and feedback as well as a much smooth working relations with both office. Apia Observatory and our office have agreed on common translation into the Samoan language, and have increased our coordination, This has resulted in a better and more comprehensive product and service for our people.

On the equipment side we have installed four Automated Remote Sensors (ARS) in Western Samoa in the last two years. We have also installed three ARSs in American Samoa. We are currently installing an ARS in Tuvalu with plans to install another ARS in Rotuma, Fiji. We are also working in installing yet another ARS on the south side of Savaii before the Hurricane season begins.

As you could see, we are doing quite a bit to improve our service to our people, but also to provide help to our neighbours, and the region in general. It is our hope that what we have accomplished with Nadi and Western Samoa will extend to Tonga, Niue and the Cook Islands as well as Tuvalu and Tokelau.

2. Australia

Dr. John Zillman
Director
Australian Bureau of Meteorological
Melbourne, Australia

The Australian Bureau of Meteorological is an agency of the Commonwealth government. Its role encompasses the operation of the national meteorological observing and data processing infrastructure, research, provision of weather and climate services and coordination of Australian involvement in the programmes of the World Meteorological Organisation (WMO). It operates 51 upper air observing stations, some 500 synoptic and climatological observing stations and 6000 volunteer rainfall observers. The national headquarters including one of the three WMO World Meteorological Centre is in Melbourne and there are Regional Forecasting Centres in all state capital cities and Darwin. The total amount staffing is 1500 and the annual budget A$140 m.

Australia has a long-standing commitment to meteorological activities in the Pacific, and since the demise of the arrangements under the South Pacific Air Transport Council (SPATC) it has worked primary through WMO Regional Association V and on a bilateral basis on activities such as tropical cyclone warning systems, equipment, specialised training and so on. Following the AIDAB (Australian International Development Assistance Bureau) funded WMO study, "The Changing Climate in Paradise", a number of initiatives have proceeded on CLICOM and other training, and AIDAB has recently decided to fund a three year A$1.1m project to assist with basic meteorological network upgrading in the Pacific. The Bureau of Meteorological looks forward to working closely through WMO RA-V and SPREP to ensure the most effective meteorological services possible in the Pacific.

3. Cook Islands

Mr. Arona Ngari
Manager
Cook Islands Meteorological Service
Cook Islands

The Cook Islands Meteorological Service contain 25 staff members on 8 of the 15 islands in the Cook Islands. On these 8 islands, 5 of them are one main station that normally record synoptic and climatological reports daily. 2 islands have pibal pilot balloon flights on 4 occasions daily. There are also two stations that observe upper air reports usually up to an altitude of 50 km.

The Cook Islands Meteorological Service has always been a branch of the New Zealand Meteorological Service since 1929 when Expatriate OICs were sent to Rarotonga to manage the observing network. The last expatriate was repatriated in early 1991 and ever since then, the OIC post, now the Manager, is a Cook Islands National.

The objective of the Meteorological Service is to provide weather reports and warnings to the community in order to minimise the loss of lives and the loss of property. These objectives has been made over the past years with guidance from Fiji Meteorological Service, the New Zealand Meteorological Service, and other Meteorological Services within the Pacific Region through one way or another. Although the Fiji Meteorological Service has been criticised several times, I must highly commend them for the great service they are giving to the Cook Islands to the best of their ability.

Other aspects that has been looked into has been the training of Meteorological Personnel. A 5 year training programme has now been put into place for personnel to be trained to WMO Class One Level. One need for this position to be identified is the shortage of Professional Staff in the Fiji TCWC especially during the Tropical Cyclone season. As one of the short falls of Fiji TCWC seems to be the contracting of Professional Staff from New Zealand and Australia, meteorologist from small island states can be utilised in this way since there is not much task that involves meteorologists in their own respective countries except research and training. Through this way also, national meteorologists can also utilise what local effects they can pick up from their own countries and give out to other forecasters in the TCWC and also for the benefit of their own countries.

The government of the Cook Islands has demonstrated its support for issues aimed at mitigating the impacts of climate change by becoming a member of WMO, ratifying the Framework Convention of Climate Change (FCCC) in early 1993, supporting environmental issues relating to sea level rise, and supporting projects in country which are friendly to the environment.

4. Federated States of Micronesia

Mr. Pedrus Ehsa
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The FSM Government believes that the Pacific region must work together cooperatively in every effort to promote the SPREP objectives. In order for FSM to effectively contribute to this effort we are humbly seeking your assistance as follows:

1. Installation of Sea Level and Climate Monitoring programs within the FSM Nation for scientists to analyse and provide information and guidance to the FSM Government on future impact of our environment.
2. Provide funding to implement a training program for national and state climate officers; using a strategy similar to the current training program for meteorologists in FSM Weather Service Offices. These officers would be responsible for the collation and analysis of climate for planning and development purposes to work closely with WMO, SPREP and other regional agencies and commissions.
3. Enhance national and regional weather monitoring and forecasting by acquiring meteorological satellite receiving, processing and interpretation facilities and the trained staff required to operate such a facility.
4. Exchange of climate data within the region of Pacific Nations for close monitoring of sea level and climate for future planning and development of our countries, especially for low coral atolls.
5. WMO and SPREP to make funding assistance available to FSM Government for participation in all available weather and climate prediction and monitoring programs and workshops which will be useful for future planning and development of the FSM Nation and the Pacific region as a whole.

5. Kiribati

Mr. Uarai Koneteti
Head of Meteorological Service
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Kiribati is a group of low lying islands in the middle of a large ocean. Because of the geography, the impact of climate change and accelerated sea level rise will be particularly devastating should they manifest themselves as predicted. Our biggest marine resources, ground water and agriculture will certainly be affected and may cause a weakening of the economy, ill health and migration to bigger countries such as Australia and New Zealand. In view of this threat, Kiribati is very supportive of the SPREP climate programme and its associated projects being carried out at present and in the future. Our government has taken some actions to keep the environment free from damage in order to maintain sustainable development.

To closely monitor the impact of climate change there is a need to develop the meteorological services by maintaining a high standard of observation and performances of meteorological equipment which includes the radar and radiosonde transceivers. I must admit that our WF33 radar performances has never been satisfactory since installation. It has gone through a series of breakdowns and sometimes it has given doubtful wind data, lost track of the balloon, and can not follow the balloon out to long range. I believe a new brand of radar would be more functional to give better representative data. The Kiribati Meteorological Service has eight stations, with Canton and Tarawa doing upper air soundings. There are about 14 rainfall stations looked after by Agricultural Assistants. Monthly summaries are sent to Fiji for distribution, and to NIWA (New Zealand) for the South Pacific Climate Monitor.

It is essential that basic observation is standardised through organised training programme. Two courses on data base impact assessment and management had been made available this year and so this is a good back up for Kiribati to have a CLICOM.

Other activities which have occurred in Kiribati include:

- Carbon/Nitrogen and Ozone monitoring
- Radiation monitoring
- Australian Sea Frame monitoring (1)
- University of Hawaii tide gauges (4)
- Climate monitoring from NIWA New Zealand

It is of great value to have these monitoring equipment installed but one valid concern is to get us involved in understanding these professions through allocated training.

TOGA Project

This is a 10 year project which will end at the end of 1994, and very soon this would come to an end. The project covers surface and upper air wind temperature observations with the aim of detecting the ENSO events, and the upper air station at Canton (91701) has been funded through the TOGA programme. For the benefit of all nations, this station should be maintained and it is hoped that it will be possible to renew the MOU which will guarantee funding for some time into the future..

Communications

Communication is an important tool in the collection and dissemination of reports. Transceivers in use are operating on a 6-9 MHz and make weather collection difficult for stations far to the east namely Canton, (91701), Kiritimati (91490) and Fanning (91487). Our means of disseminating reports to Nadi is via the Aeronautical Fixed Telecommunications Network (AFTN), which is located 3 km away from our office. As a result, our access to AFTN is by telephone, this is not practicable and most ineffective. However, our request for a shared AFTN was rejected by the Civil Aviation Authority, and also the circuit only operates at 50 baud, which is quite slow in these modern times..

I hope that SPREP, WMO, Australia and New Zealand would assist in the development of the programme where required for Kiribati Meteorological Service.

6. Marshall Islands

Mr. Paul Peter
Director of Weather Service Stations
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The Weather Service operation in RMI is funded by United States Government in accordance with the US/RMI compact of free association. The entire staff are trained and operated by RMI citizens. There is only one first order station, in Majuro, that is taking and transmitting hourly and special aviation with Microcomputer Assisted Paperless Observation (MAPSO) and six hourly synoptic weather reports daily. The upper-air observation which is called (MICROART) are taken twice daily. In addition to MAPSO and MICROART observation programmes, the climatological records are taken daily by the first and second order stations on the outer islands. These climate records are being mailed to NCDC in Asheville N.C. for verification and publication of monthly and annual Local Climatological Data (LCD) and send to RMI, WSO, (Weather Service Office) and other users.

The tide station and solar station are sponsored by the University of Hawaii and University of Colorado, and are operational. There is also one sea level and climate monitoring station, funded by AIDAB which started operating early this year. Publication of data from this station has been received and is in use. The sea level rise monitoring project is very important as the highest point of RMI is only 3 meters. There are three CMAN Station (Coastal Marine Automatic Network), one of which is out of service since the passage of last typhoon. Three more new CMAN Stations are currently being installed.

7. New Zealand

Mr. John Lumsden
Permanent Representative of NZ with WMO
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The New Zealand Meteorological Service (NZMS) has recently undergone a major structural change. Meteorological services are provided under contract by NZMS, a wholly government owned company. Similarly, climate services are provided by the National Institute for Water and Atmospheric Research (NIWA), another government owned business enterprise. Apart from public warning services, all other services are provided on a user pays basis.The benefit of this system is that the clients (users) decide what is needed, and the NZMS service tailors its product to provide the desired service.

The Government of New Zealand has contributed in many positive ways to the concerted international action aimed at reducing the impact of Climate Change. These include ratifying the Framework Convention on Climate Change (FCCC), contributing to the Global Environment Fund (GEF), supporting Pacific Island delegates in traveling to climate meetings and through its support to SPREP.

NZMS continues to support climate in the Pacific region through its involvement in training, supporting and staffing numerous Pacific Island meteorological services. Support is also provided through the tropical cyclone programme in the South Pacific, particularly as NZMS is the back up for Nadi in the event of failure for any reason. As a regional communication hub, NZMS also supports the exchange of meteorological data through the region, and is the principal gateway for meteorological information from the region entering the Global Telecommunication System (GTS).

Climate related services for New Zealand and the Pacific region are provided by NIWA. AS well as the basic data archiving and climate information services, NIWA also publishes the "South Pacific Climate Monitor", a monthly summary of the climate of the south Pacific. In the past only data from south of the equator has been available for this document, but its scope with widen shortly, as data from the northern hemisphere Pacific Islands becomes available. NIWA is also involved in research and consultancy projects, as well as providing training and development assistance to other climate services in the region.

For the future, NZMS and NIWA expertise will continue to be available, and the New Zealand Government will continue to support meteorology in the region. New Zealand welcomes the diversification of aid support, and supports strongly the desire and need for regional cooperation on climate and other meteorological issues. It is important to emphasise the link between the environment and the economy of the Pacific, and the involvement of SPREP in this area is welcomed.

8. Niue

Mr. Sionetasi Pulehetoa
Chief Meteorological Observer
Niue

Niue is a single coral island raised up by volcano activity many thousands of years ago. It is located at latitude 19 South and longitude 169 West. It is the largest coral atoll in the world, with a land area of 259 square kilometres. Niue is a self governing country from 1974 in free association with New Zealand. The people live in 13 villages of which Alofi is the capital. The highest point above mean sea level is 69 meters, and approximately 60 per cent of land is suitable for Agriculture, with the remaining 40 percent too rocky for economic use. There is no surface water but underground water is pumped and tapped for domestic and agriculture use. If there is no rain for more than 3 months, then farming will be affected severely.

There are two distinct seasons in Niue, the wet season from November to April, which coincides with cyclone season. The dry season from May to October. Most of the rainfall occurs during the wet season. During the wet season the average temperature is 27^{0}Celsius and 24 Celsius in the dry season. Niue is situated within the tropical cyclone belt and is vulnerable to cyclones. The average annual rainfall is about 1700 millimetres.

The Niue Post & Telecommunication is a composite department which includes Meteorological Services and Marine Radio Watches. The Niue Meteorological unit consists of 4 stations - synop, metar, climate and rainfall. Niue Island has a population of 2,400 and to date this department has not had the resources to support such matters as climate archiving and management. Climate data is presently sent to the New Zealand National Institute of water and Atmospheric Research (NIWA) for analysis and catalouguing into a useful statistical format for agriculture use. The Niue Meteorological Service is owned by government and fully funded by the New Zealand Meteorological Service with other assistance from the World Meteorological Organization. Installation of new equipment (e.g. Anemometer) is provided by New Zealand Meteorological Service with assistance available from local technicians.

Most of Meteorological observers have received their training locally, taking into account the number of years they join the Meteorological Service of Niue. Alofi Station has 5 full time observers at conducts 8 full synoptic observations per day. Hanan Airport provides limited METAR observations courtesy of 2 air traffic officers. Vaipapahi is a climate station and has 2 part time observers from the Agriculture department. Similarly, Liku Station takes rainfall measurements courtesy of 2 part time observers from Telecom.

Finally, Niue Meteorological Service is seeking financial assistance from the World Meteorological Organisation, New Zealand and Australia to train meteorological observers from basic level up to level 3 standard, and possibly a qualified meteorologist in the future.

9. Palau

Mr. Hiob Mesubed
Director
Bureau of Weather Services

Palau Weather Service is operated by US Government in cooperation with the Government of the Republic of Palau. Palau Weather Service has 9 certified observers who work shifts to run the station 24 hours a day. There is one electronic technician who is responsible for calibration of equipment and takes care of the stations electronic side of operation.

Upper air soundings are taken twice a day. There are also hourly and special surface observations. Other related areas under weather supervision are: University of Hawaii tide station, sea level monitoring station, marine station, and cooperative observation stations. Storm warnings and weather forecast are provided by JTWC, Guam. The Palau Weather Service prepares its own local adaptive forecast for the public twice a day.

Palau local climatological records are published in documents issued by the US National Climate Centre, Asheville, N.C. monthly and annually. Copies are also available in Palau weather office.

10. Papua New Guinea

Mr. Paul Penua
Acting Director
PNG National Weather Service
Port Moresby

Papua New Guinea National Meteorological Service began as part of the Queensland Regional Office of the Australian Bureau of Meteorology. In 1969 the first nine local observers were recruited and trained. In 1973 PNG gained self government, and in March the same year Australia handed over the responsibility for providing weather services to the PNG Government and it became known as PNG National Weather Service.

Staff at the time of hand-over in May 1973 was approximately thirty five, including several Australian staff. The NWS at the time was geared mainly to serve the needs of the Aviation Industry. Little or no considerations at all was given towards many other functions that are normally provided such as Marine Meteorology, Public Weather Bulletins Agrometeorology, Forestry, and Climatology and Data Processing and Management/Archiving.

Under the National Government five Year Investment Programme, funding is being allocated for Building of New Stations with Office/Residences. This programme was approved in 1985 and it is currently progressing. Since the inception of this programme we have increased the number of official stations from seven in 1973, to 12 today. The office at Kieta remains closed.

In addition to the Infrastructure Component the National Government has re-allocated some money for Initial Observers' Training, which comes under the Department of Education National Scholarship Branch, for ten students to be trained each year. Unfortunately no Funding is being given to areas such as Technical Officers Forecasting, Meteorologists Training, Technical Maintenance Training on Meteorological Equipment, Radar, Satellite etc.), Climatology, Agrometeorology Training, Water Resources-Hydrological specialise training. Some of the above training have been available to us through outside assistance via various WMO Programmes such as VCP, the RA (V) Programme, Australia and New Zealand Aid Assistance.

A review of the PNG NWS monitoring system was initiated and funded by PNG NWS with Bureau of Meteorology Australia in late 1991 in view to identify the following:

1 The effectiveness of the current Monitoring Systems which includes the Synoptic Recording Network - official and allowance stations:

   (a) Upper Air Observing Network
   (b) Radar Network
   (c) Communication Network

2. Provide recommendations on areas which require improvements so that full coverage of Weather Parameters from both Surface and Upper Air are available for use.

3. Provide recommendations on other systems for in cooperation into the current systems in view to serve PNG National needs and the Regional requirements, such as:

4. Proposed additional Surveillance Radar Network to overlap Australia's Radar Network AWS Reporting Network - First One Port Moresby - 1993.

Initial discussions with PNG Government has been done and the Draft Document has been submitted to AIDAB. In September 1993, discussions on the Draft Document took place with AIDAB consultants in Port Moresby.

In June 1992 the RIO Convention for the Earth's summit which called for Global commitment to the implementation of measures for Achieving Sustainable Development. Papua New Guinea was a signatory to the Earth Chapter and Agenda 21. In November of the same year PNG Government hosted a Post RIO meeting in Port Moresby. Many related issues were discussed and a good number of recommendations were made one of this was the setting of a National Sustainable Development Strategies Committee (NSDS). One of it's tasks was to provide co-ordination between relevant departments and organisation to provide Data and relevant information towards attaining the objective of the RIO Convention. PNG National Weather Service is part of NSDS.

11. USA

Mr. Richard Hagemeyer
Director, US Department of Commerce
Honolulu, Hawaii

WSFO Honolulu is the major forecast center in the region. It has a staff of 45, with 22 meteorologists, including four meteorologists on duty around the clock. The WFO in Guam currently has 3 meteorologists, soon to be increased to a staff of 13, including 7 meteorologists, at which time there will be one meteorologist on duty around the clock. WSO Pago Pago currently has one meteorologist on station with a second (recently graduated from the University of Hawaii) in training at the WSFO Honolulu. In Micronesia the WSOs at Majuro, Pohnpei, Chuuk, Yap and Koror are funded by US as a part of the Compacts of Free Association. There are no meteorologists currently on station but personnel from Majuro, Pohnpei, Chuuk, and Yap are in training in Honolulu and will return to their stations upon graduation. It is expect that a graduate from Koror will commence training within about six months.

In Micronesia there are currently 9 operational stations observing and reporting wind, pressure, pressure tendency, and temperature via US GOES or Japan GMS plus ARGOS. The FM12 SYNOP format is used for reports, and the collective is available on WMO GTS. The network is configured to cover the tropical cyclone genesis area and to track passage through Micronesia. A total of 20 stations are planned in the future. A network of stations observing daily maximum and minimum temperature, and precipitation for climatological purposes is also in place.

In Hawaii, local tidal information is relayed to the Pacific Tsunami Warning Centre (PTWC) in real-time or near real-time. Around the Pacific: there are approximately 90 stations reporting sea level via the US GOES and the Japan GMS satellites. They report hourly, three hourly, and four hourly depending upon the station. This is a cooperative effort with the JMA, TOGA Office at the University of Hawaii, Atlantic Oceanic and Meteorological Laboratory (US/NOAA), US/NOAA - National Ocean Service, New Zealand, and Niue. These are more than 95 of these stations.

TOGA Tropical Atmosphere Ocean (TAO) network is an array of moored buoys located between 10°N and 10°S and 95°W and 135°E deployed in support of the TOGA Programme. The buoys measure wind, atmospheric temperature, sea surface temperature, and ocean pressure at 300 and 500 metres. Data from the buoys are transmitted on the WMO GTS. 73 such buoys are planned to be operational by the end of 1994.

12. Western Samoa

Mr. Auseialia Titimaea
Director
Apia Observatory
Apia, Western Samoa

Western Samoa's Meteorological Services is a section within the Apia Observatory division which comprises of 3 other sections mainly geophysics (seismology and geomagnetism); hydrological, (water resources); and geological, (water well and investigation drilling). New Zealand first took the initiative in establishing the Meteorological Services in 1921 with the executing agency being the New Zealand Meteorological Services. The whole set-up was transferred back to government after independence to be under the auspices of the Department of Agriculture, Forests and Fisheries.

With the depletion of resources due to cut-backs, reduction in external technical assistance and staffing problems, there was a need to re-define the limits of the services functions. At this point in time, only the basic functions can be performed effectively. Such functions are:

- to ensure that the necessary meteorological information is relayed to the regional forecasting centre-Nadi to assist in forecast of the local weather situation;
- to issue daily weather forecasts to the public;
- timely dissemination of TC warnings as issued by the regional forecasting centre;
- provide accurate climatic information to all users

The functions as defined may not be fully implemented if certain routine work activities are not carried out by staff. It is important that a daily service is in operation. Because of the limited resources, it is possible that we may not be able to meet our committments in the event of the unforseen unavailability of staff. However as yet this situation has never eventuated. Activities include:-

- carry out synoptic (3-hourly) and daily climatological observations in existing stations;
- perform annotation and data entry from Automatic Weather Stations (AWS)
- perform data entry into computer using clicom software; provide climate data to developers and development projects personnel and any other user that requests for data.

There are presently 5 climatological stations, two (2) of which have synoptic capability. That is, Faleolo (575900) and Apia (576200). Additionally, 4 Automatic Weather Stations (AWS) and 20 rainfall stations are part of the network.

Major constraints to the further development of meteorological services in Western Samoa are:

- *Communications Equipment:* Mediocre performance of such facilities lead to breakdown and shortfall of linkages between centre and Nadi; and the diversity of national systems.
- *Instruments and Maintenance:* Obsolete instruments are in need of replacement, and there is very little routine maintenance.
- *Staff Shortage:* Major problem with staff leaving for better blessings in the private sector or other highly paid jobs

Areas of expected development in the near future include;

- A proposal had been submitted to government for the Apia Observatory to become a separate entity (1988, 93)
- A project proposal for its upgrade to become a National Meteorological Centre status (1988), seeking assistance from Japan or Australia (building)
- Possible AIDAB assistance through the sea level and climate monitoring regional project ("Changing Climate in Paradise" recommendation)

Western Samoa Meteorological Service is performing well given the limited resources, however there is room for improvement and this is heavily dependent on external assistance. There is a need for further support from the larger services in the region, for example Australia and New Zealand, as well as WMO. Lastly, I wish to acknowledge the assistance of Nadi, Wellington, National Weather Service of the United States through their Pago Pago office, and all others involved in making our meteorological service possible.

Annex 5: Meeting Recommendations

The Directors of Meteorological Services of SPREP member countries and territories recommend the following technical ways of cooperatively enhancing meteorological services of the region.

1. Endorse closer coordination between Meteorological Services at a regional and sub-regional level.

2. Personnel Training:

   Develop skills in all areas of meteorology where possible utilising the capabilities of the region and, where necessary, out of the region.

3. Encourage and develop the exchange of staff, data and information within national, regional and international organisations.

4. Develop a coordinated programme to expand and up-grade meteorological equipment, and where possible standardise equipment and procedures.

5. Encourage implementation of CLICOM system throughout the region and improve its efficiency by regular exchange of developmental reports.

6. Improve Nadi Tropical Cyclone Warning Centre capabilities in the following areas, by seeking assistance from donors and member countries:

   (a) Meteorological data handling and exchange;

   (b) tropical cyclone tracking and warning; and,

   (c) meteorological communication.

7. Improve and make better use of communication systems, particularly under special circumstances, e.g. tropical cyclones.

8. Develop a coordinated scientific policy on climatological and meteorological issues and operational systems, to implement that policy.

9. WMO and SPREP should coordinate and convene annual meetings of Directors of Meteorological Services to discuss and review the above Meteorological and Climatological issues pertinent to the region.